Serial No.: 10/583,971
Docket No.: SH-0064PCTUS
(RYU.025)

REMARKS

Claims 1-13 are all the claims presently pending in the application. Applicant has amended claims 1 and 5 to define the claimed invention more particularly.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-7, 9, 11, and 13 stand rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. Claims 1 and 2 stand rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite. Claims 1-3, 6, 7, and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Itoh, et al. (U.S. Patent Publication No. 2003/0101772 A1; hereinafter "Itoh") in view of Sarkar (U.S. Patent No. 5,558,693) in view of Ishihara (U.S. Patent Application Publication No. 2003/0024273). Claims 4 and 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Itoh in view of Sarkar and Ishihara, and further in view of Suda (U.S. Patent No. 4,801,322) and Takimoto (U.S. Patent No. 4,661,140). Claims 9 and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Itoh in view of Sarkar and Ishihara, and further in view of Moltzan (U.S. Patent No. 3,565,345).

Applicant respectfully traverses these rejections in the following discussion.

I. THE CLAIMED INVENTION

An exemplary aspect of the claimed invention (e.g. as recited in claim 1) is directed to a method of manufacturing porous glass base material for optical fiber.

The method includes flame-hydrolyzing raw materials in an oxyhydrogen flame to generate glass fine particles, using a burner to deposit the glass fine particles on a rotating target to form the porous glass base material, the burner being moved relatively to the rotating target, adjusting an amount of hydrogen and oxygen supplied to the burner, cooling a surface of the porous glass base material while using the burner to deposit the glass fine particles while adjusting a temperature difference (Ta-Tb) between a surface temperature of the porous glass base material when touching a flame of the burner (Ta) and a surface temperature of the porous glass base material prior to touching the flame of the burner (Tb) to be within a range from 200 °C to 700 °C, and dehydrating and sintering the porous glass base material to transform the porous glass base material into clear glass.

The porous glass base materials made by conventional methods were found to have significant drawbacks. For improving the deposition efficiency, an excessive cooling makes a large surface temperature difference between the outer layer and the inner layer in the porous glass base materials. This causes a difference between the contraction ratio of the outer layer and the inner layer, which may cause cracks to form on the surface of the glass base material. (Application at page 3, lines 19-25).

On the other hand, an exemplary aspect of the claimed invention may include a method of manufacturing porous glass base material for optical fiber, including cooling a surface of the porous glass base material during deposition while adjusting the temperature difference (Ta-Tb) to be within the range from 200 °C to 700 °C (e.g., see Application at page 3, lines 26-30). This exemplary feature may provide a method of manufacturing porous glass base material for optical fiber in which cracking of the surface of the porous glass base material is prevented and a glass particle deposition rate is improved (e.g., see Application at page 5, lines 3-4).

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II. THE 35 U.S.C. § 112, FIRST PARAGRAPH, REJECTION

The Examiner alleges that the original specification fails to provide sufficient written description of the claimed invention. Specifically, the Examiner alleges that the original specification does not provide support for adjusting the hydrogen and oxygen "during said using", as recited in exemplary claim 1.

While Applicant does not concede that the original specification does not provide support for previous claim 1, merely in an effort to speed prosecution, Applicant has amended independent claim 1. Specifically, Applicant has amended independent claim 1 as follows: "*adjusting an amount of hydrogen and oxygen supplied to said burner;* ~~during said using said burner.~~"

Applicant submits that the originally filed specification provides support for the claimed invention. Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection.

III. THE 35 U.S.C. § 112, SECOND PARAGRAPH, REJECTION

Claims 1 and 2 stand rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite. The Examiner, however, does not address claims 1 and 2 in the rejection. Instead, the Examiner addresses dependent claim 5.

Specifically, the Examiner alleges that it is unclear as to what is meant by the tubes "comprising" the gases recited in claim 5.

Applicant has amended claim 5 to clarify that the claimed tubes are supplied with the recited compounds.

Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection.

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IV. THE PRIOR ART REJECTIONS

The Examiner alleges that one of ordinary skill in the art would have combined Sarkar and Ishihara with Itoh to render obvious the claimed invention of claims 1-3, 6, 7, and 11. Furthermore, the Examiner alleges that one of ordinary skill in the art would have combined Suda and Takimoto with Sarkar, Ishihara, and Itoh to render obvious the claimed invention of claims 4 and 5. Finally, the Examiner alleges that one of ordinary skill in the art would have combined Moltzan with Sarkar, Ishihara, and Itoh to render obvious the claimed invention of claims 9 and 13. Applicant respectfully submits, however, that, even if combined, the alleged combinations of references would not teach or suggest each and every feature of the claimed invention.

That is, the alleged combinations of references does not teach or suggest, "*cooling a surface of the porous glass base material during said using the burner to deposit the glass fine particles while adjusting a temperature difference (Ta-Tb) between a surface temperature of said porous glass base material when touching a flame of said burner (Ta) and a surface temperature of said porous glass base material prior to touching said flame of said burner (Tb) to be within a range from 200 °C to 700 °C*", as recited in exemplary claim 1.

Itoh discloses that "the portion to be formed into a porous layer 2 on the surface of the starting material 1 is preheated with a heating burner 4, adjacently before forming the porous layer 2" (see Itoh at paragraph [0016]; emphasis added by Applicant). Accordingly, Itoh fails to teach or suggest the above feature of the claimed invention.

The claimed invention, instead of applying heat, cools a surface of the porous glass base material during deposition.

Due to this feature, the claimed invention can improve the deposition rate of the glass fine particles for the following reasons. By cooling the surface of the porous glass base material, except for the area where the particles generated by flame hydrolysis directly hit the target, when the depositing burner moves to the cooled area, the temperature gradient increases as compared to the cooled area with the neighboring area around the surface of the base material, which has a high temperature due to the flame during the deposition. As a result, the glass fine particles migrate to the low temperature area so that the deposition efficiency is improved (e.g., see Application at page 2, lines 16-30).

Furthermore, due to the feature "*adjusting a temperature difference (Ta-Tb) between a surface temperature of said porous glass base material when touching a flame of said burner (Ta) and a surface temperature of said porous glass base material prior to touching said flame of said burner (Tb) to be within a range from 200 °C to 700 °C*", the claimed invention provides the following results. Adjusting the temperature difference to be less than 700 °C can prevent the surface of the glass base material from being cracked due to the difference between the concentration ratio of the outer layer and the inner layer. When an excessive cooling is performed, a large surface temperature difference between the outer layer and the inner layer in the porous glass base material occurs (e.g., see Application at page 3, lines 21-25). In addition, adjusting the temperature difference to be more than 200 °C makes it possible to maintain a high deposition rate (e.g., see Application at page 5, lines 5-9).

As explained above, Itoh fails to teach or suggest "*cooling a surface of the porous glass base material during said using the burner to deposit the glass fine particles,*" and fails to recognize the above problems/results caused by cooling the surface of the porous glass base material during deposition.

Moreover, the secondary references fail to make up the deficiencies of Itoh.

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Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw these rejections.

V. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-13, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. Applicant respectfully requests the Examiner to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, Applicant requests the Examiner to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The undersigned hereby authorizes the Commissioner to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: November 9, 2010

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